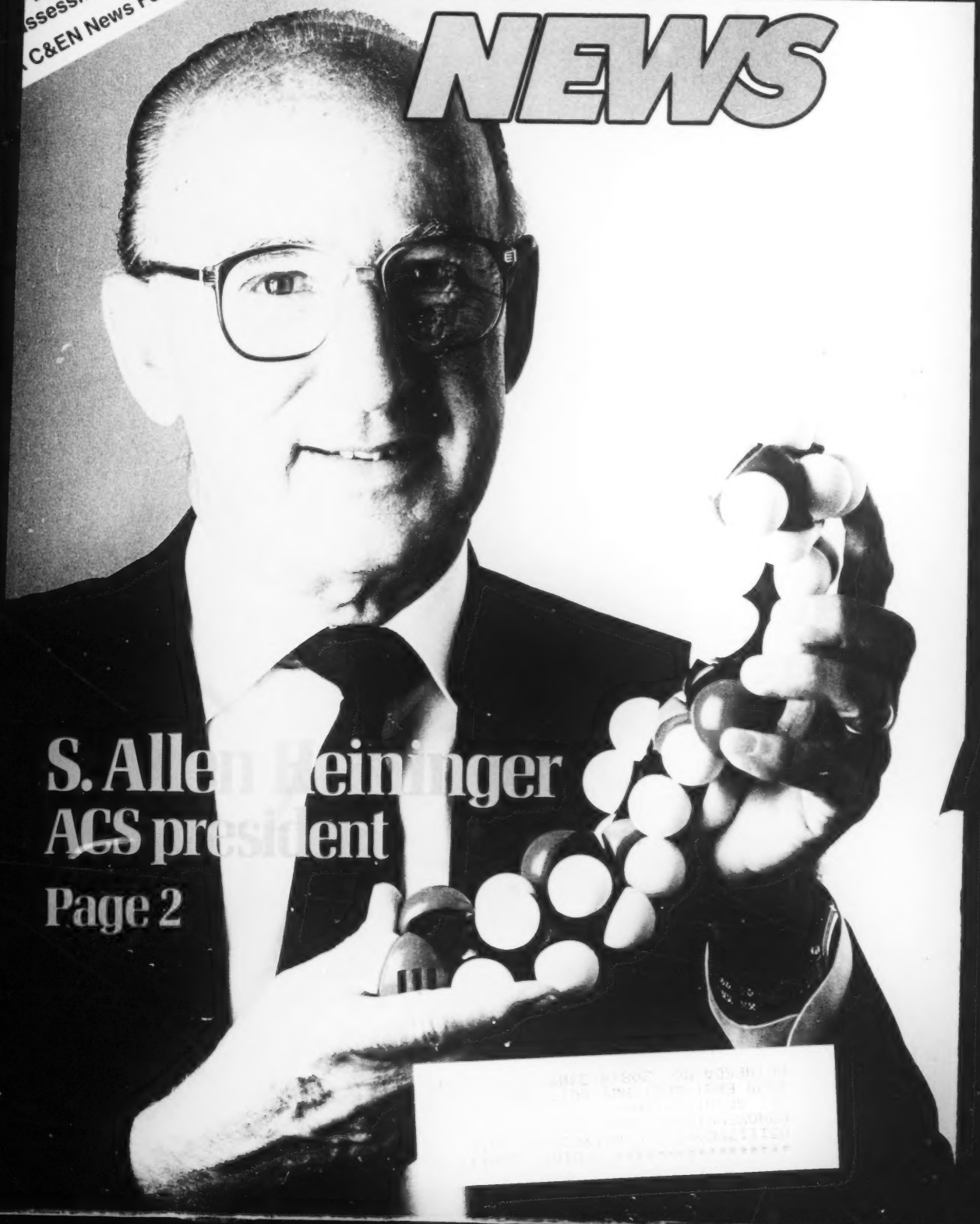
JANUARY 7, 1991
CHEMICAL & ENGINEERING

NEWS

Experts debate risk assessment of pesticides
C&EN News Forum Page 27



S. Allen Heininger
ACS president
Page 2

CHEMICAL & ENGINEERING
NEWS
JANUARY 7, 1991

Volume 69, Number 1
CENEAR 69 (1) 1–88
ISSN 0009-2347

News of the Week

■ **Soviet economy and industry, including chemical industry, are in grim shape and will continue to disintegrate without rapid shift to a market economy, according to landmark study by major international economic organizations.** **Page 6**

■ **Ozone hole over Antarctica could double in size in the future, according to a new analysis.** **Page 7**

■ **A new program will enable industrial scientists to influence the direction of academic research on the theoretical simulation of molecular systems.** **Page 7**

■ **Successful testing of genetically engineered factor VIII in more than 100 hemophiliacs offers great promise for hemophiliacs deficient in this blood clotting protein.** **Page 8**

■ **Hercules' new chairman and chief executive officer, Thomas Gossage, initiates strategically significant organizational and management changes.** **Page 8**

Cover: Photo by Stephen Kennedy

President's Message 2
Letters 4
Editor's Page 5

Concentrates
Business 9
Government 14
Science/Technology 20

The Departments
ACS Comment 56
ACS News 57
Awards 58
Newscripts 88

Business

British specialty chemicals producer MTM looks to 1991 for consolidating its diverse product mix following several years of rapid growth via acquisition. **Page 11**

Government

Union Carbide's two controversial Arizona chemical plants will soon begin operating as community protests over the plants' sitings and resultant delays wind down. **Page 15**

Science/Technology

Reducing engine emissions is a complicated problem, according to data gathered during a major testing program sponsored by oil firms and automakers. **Page 21**

New steam-explosion process designed to pulp a variety of paper wastes aims to eliminate municipalities' need to separate collected paper wastes. **Page 22**

Characterization of 2,4-dichlorophenol degradation pathway opens new possibilities for developing bioremediation strategies for chlorophenols. **Page 22**

Meetings

Deadlines and topics for ACS meetings in fall 1991, spring 1992, and later dates. **Page 59**

News Forum

Prominent figures representing five distinct viewpoints present their contrasting opinions on whether the risks from pesticides have been grossly exaggerated. **Page 27**

Chemistry, Society, and ACS

S. Allen Heininger
ACS president

As incoming president, it is my privilege to communicate to the membership of the American Chemical Society my personal views on the "State of the Society"—and what I see as the key things to be addressed in my presidential year.

The issues are many—from crises in science education to global climate change and the public perception of chemistry to lawsuits over intellectual property issues, plus a host of others.

Some relate to the science of chemistry itself, some to how chemistry interacts with the society in which we function, and some are internal to the operation and well-being of ACS as an organization. I'll address each in turn.

Fundamental to all, however, is the recognition that change is inherent in whatever we do. Our science of chemistry itself offers the best example of the continual evolution of knowledge. No chemist would dream of leaving school and try to earn a living using only the knowledge possessed at graduation. Continuing education is a must for any scientist—and continual change is equally a must for any scientific society striving to effectively serve the diverse needs of its members and its profession.

The changing world of chemistry

As our understanding of the world of chemistry around us extends into the life sciences through recombinant DNA and the frontier areas of protein chemistry and molecular biology, ACS must increasingly seek to establish common ground with those who have traditionally seen themselves as "natural scientists"—biologists, botanists, and so forth. Their understanding of natural evolutionary processes and phenomena, when coupled with chemistry's emerging tools of structural identification, synthesis, and engineering scaleup will unlock vast new opportunities to benefit mankind. As chemists, we must continually seek ways to facilitate the merging of the disciplines of science, since history demonstrates that it is at the periphery of separate knowledge bases that most discoveries are made.

To facilitate this process, with the leadership of the Committee on Science, an ACS presidential symposium on Expanding the Chemistry/Biology Interface is being planned for fall 1991. It will focus on the education of future scientists. Modern biology requires the integration of chemistry, computer science, engineering, applied math, and physics—in addition to biology itself. Educating future scientists into this complex of disciplines will necessitate thoughtful changes in how both chemistry and biology are taught in the 21st century. It is not too early to begin to think through how best to accomplish this.

As chemists, we must continually seek ways to facilitate the merging of the disciplines of science

On another frontier, the continued demands for higher performance materials create an equally complex problem. Materials science isn't yet an accepted discipline, but it is a broad frontier of change at which cutting-edge chemistry is demanded. New materials are required for space exploration, hypersonic flight, a broad range of defense needs, and to support the continued evolution of the electronics revolution itself. In the civilian sector, medical devices, high-performance materials for automotive use, metal alloys, ceramics, polymer composites, conductive polymers, and membranes for thin-layer separation systems all demand chemistry of the highest order of sophistication. ACS must find more effective ways to serve this materials science area—or risk losing the membership and involvement of a vital growth area of chemistry.

As chemists, we must avoid shackling ourselves to only what we learned in school, and the limits imposed by the traditional disciplines of chemistry. The entire periodic table is ours to employ for the benefit of society. As our knowledge grows, so must our vision of the future. While classical chemistry remains the bedrock foundation of our profession and must be nurtured and sustained, it must be capable of integrating with the concepts, methods, and advances of related sciences.

The demand for continued education is especially important for chemists employed in industry. Since they often toil in vineyards far from the academic frontiers, industry leadership must recognize the need to fight obsolescence of their work force. If industry is to avoid the redundancies and restructurings of the 1980s, with the inevitable human disruptions it created, providing constant opportunities for upgrading the skills of its scientists is a must. ACS through its continuing education short courses, its satellite TV presentations, national meetings, and publications offers a rich and expanding source of educational materials. This remains a major area of linkage between the academic and industrial members of ACS, and must be continually strengthened, especially through incorporation of modern videodisc and videosatellite techniques. Guidance from industry leaders on how to make ACS offerings most relevant to their foremost needs must be actively sought—and responded to.

SOVIET ECONOMY: Study calls radical reform imperative

The Soviet Union's economy and industry—including its chemical industry—are in grim shape, and will continue to disintegrate without a rapid shift to a market economy, says an authoritative study just completed by four international economic organizations. A gradual reform program is bound to fail, it stresses. And without radical, comprehensive reform, it adds, large-scale western aid would be wasted and should not be given.

The study, probably the most thorough one yet of the Soviet economy by western economic institutions—with access to hitherto unavailable data—was commissioned at the Houston Economic Summit last July by the leaders of the seven major industrial democracies. It was carried out by the International Monetary Fund, the International Bank for Reconstruction & Development (World Bank), the Organization for Economic Cooperation & Development, and the European Bank for Reconstruction & Development.

The bleak picture the study paints is supported by recent statistics on Soviet industrial and chemical production. Through September, industrial production overall dropped 0.9% from the same period in 1989, according to the third-quarter plan fulfillment report by the U.S.S.R. State Committee on Statistics. And the United Nations Economic Commission for Europe projects a decrease of 1.5% for all 1990. The plan fulfillment report shows that gross national product decreased 1.5% compared with the first nine months of 1989, national income dropped 2.5%, and productivity of public labor fell 1.5%.

Soviet chemical industry—one of the fastest growing sectors in the 1970s and most of the 1980s—also fell 0.9% in output through September. Production of some key chemicals dropped much more, with sulfuric acid down 3%, sodium hydroxide down 7%, and synthetic ammonia and sodium carbonate down 8% each. For the first 11 months of 1990 and 1989, polyethylene output was down 3% and polypropylene 6%.

The plan fulfillment report notes that the shortfall in chemicals hinders development of other key sectors, including machine building, the agro-industrial complex, and consumer goods. More than half the chemical enterprises failed to meet their obligations to clients. Shortfalls in bulk plastics production (polystyrene and styrene copolymers, polyethylene, and polypropylene) created a shortage of raw materials for production of thermoplastic pipes and pipeline parts, output of which dropped 9%. Shortages were also created for polyethylene bags, and polymer barrels, trays, and boxes.

The study notes that "the traditional centrally planned system has largely collapsed, but has not been replaced by a functioning market system"—blocked by lack of a political consensus. Piecemeal reforms have failed to halt the decline, or have even been counterproductive. Indeed, the State Committee on Statistics cites "loss of the ability to control the national economy, the violation of economic ties, and the deterioration of labor and contractual discipline." Unemployment and monetary and financial imbalances are increasing. The overall balance of payments deficit in convertible currencies is projected at $14 billion for 1990. Oil and coal production are dropping. Open ethnic conflicts disrupt output and transport, republics increase their autonomy, and environmental concerns grow.

"The progressive breakdown is perhaps most visible at the retail level, with few goods to be found in state shops, barter becoming common, and black markets and the dollarization of the economy spreading rapidly," the study points out. Rationing is already widespread.

Soviet output of key chemicals plummeting

	% change	
	1989–90	1989–90[a]
Sulfuric acid	–3.6%	–3%
Sodium hydroxide	–4.2	–7
Synthetic ammonia	–7.9	–8
Sodium carbonate	–3.7	–8
Synthetic detergents	9.8	9
Mineral fertilizers	–7.5	–8[b]

a For January through September. b For January through November. Source: Plan Econ Inc.

Even if the Soviets adopt radical reform, things will get worse before they get better, the study says. But the West can aid greatly with technical assistance, humanitarian aid with food and other needs, programs in areas like the environment and energy, and financial aid.

The study jibes with a recent evaluation of Soviet chemical industry by PlanEcon Inc., a Washington, D.C.-based firm specializing in research on Soviet and East European economies (C&EN, Oct. 8, 1990, page 4). Jay K. Mitchell, manager of Soviet and East European chemical services at the firm, agrees radical reform is required. "It's long past the point of gradual reforms. Things are just splitting apart," he notes. But, he warns, "even if the central government adopts a radical reform program, it might not be able to get the republics to implement it now. The main problem now is the political instability caused by the economic problems. There is a real threat of dictatorship."

Richard Seltzer